PEACE/WILLISTON
FISH & WILDLIFE
COMPENSATION
PROGRAM

BC hydro

BRITISH
COLUMBIA

A Reconnaissance Survey Of Pothole Lake No. 1

D. A. Jesson
1989

PWFWCP Report No. 92

105-02856/

The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave. 3rd Floor, Prince George B.C. V2L 3H9

Website: *www.bchydro.bc.ca/environment/initiatives/pwcp/*

This report has been approved by the Peace/Williston Fish and Wildlife Compensation Program Fish Technical Committee.

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A RECONNAISSANCE SURVEY OF

POTHOLE LAKE NO. 1

WATERSHED:	PARSNIP RIVER
DATE OF SURVEY:	JUNE 15. 1989
FIELD CREW LEADER:	DA JESSON
FIELD ASSISTANT:	M.G. LABACH
REPORT PREPARED BY:	D.A. JESSON

WILLISTON FISHERIES PROJECT

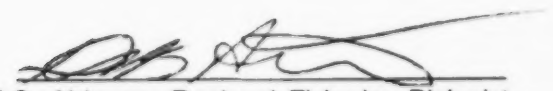
B. C. HYDRO

ENVIRONMENTAL RESOURCES

and

MINISTRY OF ENVIRONMENT

RECREATIONAL FISHERIES BRANCH

RELEASED BY: 

D.H.G. Ableson, Regional Fisheries Biologist

LAKE: POTHOLE LAKE NO. 1 **SYSTEM NAME:** POTHOLE LAKE NO. 1

A.S.A.P. REFERENCE NO.: **SYSTEM NO.:** 25-0300-005

DATA ON FILE FOR THIS SURVEY

Location	X	Dissolved O2/Temp. profiles	x
Physical Data	x	Netting Record	x
Bench Mark	x	Lake Catch Summary	x
Terrain Features	x	Individual Fish Data	x
Access	X	Fish Preserved	–
Resorts and Campsites	x	Stomach Analysis	x
Other Developments	x	Scale Reading	x
Obstructions and Pollutions	x	Location of Inventory Sites	x
Special Restrictions	x	Photograph Directory	x
Aquatic Plants	x	Appendices:	
Wildlife Observations	x	A: Water Chemistry Analysis	x
Miscellaneous Comments	x	B: Tributary Stream data	x
Lake Drainage	x	Bathymetric Map Reduction	x
Fisheries Management Comments	x	Bathymetric Map	x
History of Previous Surveys	x		
Water Chemistry Summary	x		

LOCATION

Location: 34 km N of Mackenzie
Elevation: 693 m ±
Latitude/Longitude: 55°35'44":123°22'40" U.T.M.: 10.4762.61608
Management Unit: 7-30 N.T.S. Map No.: 930/11

Drainage: Closed System or Possible underground flow Williston L. (Parsnip Reach) –> Peace River

PHYSICAL DATA

Lake Drainage Area:	- km^2	Volume:	2,960,000 m^3
Water Surface Area:	196,700 m^2	Flushing Rate:	
Area above 6 m contour:	53,700 m^2	Perimeter of Islands:	30 m
Shoreline Perimeter:	1,950 m	Number of Islands:	1
Maximum Depth:	33.0 m	Mean Depth:	15.0 m
Filterable Residue (TDS):	100 mg/l	Secchi Reading:	17.45 m

Sounding Device: Lowrance X-15 Elevation Source: Contour interpolation

BENCHMARK

(Iron spike, center of red circle) located 2.0 m above present water level in a 30 cm diameter spruce tree on the west shore of the lake, 5 m north of the trail access at the lake.

High water mark: 0.45 m above water level at time of survey.

Lake: **POTHOLE NO. 1**

TERRAIN FEATURES

Immediate Shoreline:

Pothole No. 1 is a kettle lake with characteristic moderately steep to steep sloping shoreline to the water's edge. Forest cover is complete and dense to the water's edge restricting land access to the lake to trails only. The lake bottom drop off from shore ranges from moderate (access location) to steep (east shore). Deadfall is found along much of the lake's perimeter but does not deter boating access to any great degree, except for the most northerly bays. A complete border of alder, birch and poplar fronts most of the shoreline. Lake bottom substrate near shore consists of a mixture of organics, gravels and cobbles.

Surrounding Country:

Pothole Lake No. 1 is located in a glacial depression with the surrounding country characterized by gently rolling hills with moderately steep to steep hillsides. The surrounding forest appears to be mature first growth consisting of 60% coniferous (spruce) and 40% deciduous (popular, birch, some alder) species. Small patches of logged area in secondary succession are visible on the mountainside to the northeast. This does not detract from the lake's aesthetic value.

Pothole Lake No. 1 is located within the sub-boreal spruce biogeoclimatic zone.

Lake: **POTHOLE NO. 1**

ACCESS

Directions:

From the corner of Mackenzie Boulevard and Centennial Drive in downtown Mackenzie, travel north on Mackenzie Boulevard (Highway 39). On the outskirts of town (where gravel starts) the road becomes known as the Finlay Forks Forest Development Road. At 38.0 km turn left onto the Six Mile Bay Recreation Site Road. Keeping straight, drive 0.4 km and then turn left onto an unnamed road. Drive 0.5 km to the access trail location. Take the access trail on the left 170 m to the lake. The total distance by vehicle from Mackenzie to Pothole Lake No. 1 is 38.9 km.

Road Type and Conditions:

Highway 39 is a paved, two lane road in good condition.

Finlay Forks Forest Development Road is a fair, two wheel drive gravel logging road.

Six Mile Bay Recreation Site Road is a single lane, dirt road in fair condition and accessible by two wheel drive vehicle.

Unnamed road is narrow, one lane and overgrown with vegetation. Vehicle access would be restricted to snow-free months only.

The access trail is steep and undeveloped. The trail entrance is overgrown and difficult to spot.

Restrictions:

None noted.

RESORTS AND CAMPSITES

None. The steep hillsides down to the lake would restrict camping to a small area at the end of the access trail at the lake.

OTHER DEVELOPMENTS

A second trail leading to the north shore of the lake is said to exist. It was not investigated.

Lake: **POTHOLE NO. 1**

OBSTRUCTIONS AND POLLUTIONS

Some litter (cans, bottles) was present at the access point to the lake.

SPECIAL RESTRICTIONS

None known

AQUATIC PLANTS

Aquatic vegetation was restricted to the sparse, sporadic distribution of Chara sp. throughout the littoral area of the lake and Potamogeton sp. No plants were collected.

WILDLIFE OBSERVATIONS

One beaver was sighted during the survey.

MISCELLANEOUS COMMENTS

1. Gammarus sp., tadpoles and water striders noted.
2. Some clean patches of gravel near shore suggest the possibility of rainbow trout attempting to shorespawn. However, the eggbound condition of the females sampled indicates eggs were not dropped.
3. Springs are said to exist in the lake and may contribute to shorespawning activity.
4. The steep access trail to the lake would restrict outboard motor use. A motor restriction may want to be considered for this lake due to its small size.
5. Two people angling with spinning gear produced 6 strikes and 2 rainbow trout (350 grams each) in 0.5 hrs.
6. Lake chub observed schooling in the shallows at the north end of the lake.
7. Unidentified fry (probably lake chub) approximately 20 mm in length observed near the access point and the north end of the lake.
8. Bathymetric map: The outline for this lake is from an enlargement of aerial photograph BC 7369 No. 263, flown July 31, 1971.

Lake: POTHOLE NO. 1

LAKE DRAINAGE

General:

Pothole Lake No. 1 appears to be a "closed system", as no inlets or outlets were identified during the survey. Edition 2 of NTS map 930/11 (published in 1981) indicates an outlet from the lake flowing west into the Six Mile Creek embayment of Williston Lake. This outlet was not found.

Major/Minor Systems:

There are no major or minor systems. Pothole Lake No. 1 is a "closed system".

Lake: **POTHOLE NO. 1**

FISHERIES MANAGEMENT COMMENTS

Pothole Lake No. 1 is under a continuous rainbow trout stocking program by Recreational Fisheries Branch, Prince George. Netting information indicates the fish are doing very well, with one net set of 2.5 hours producing 22 rainbow trout with an average fork length of 369 mm and an average weight off 570 grams.

Local knowledge indicates the lake does not receive much fishing pressure during the summer due to the difficulty in hooking a fish. The lake does receive moderate pressure during the winter as an ice fishery. Part of the problem for lack of fishing success in summer may be attributed to the spawnbound condition of the majority (95%) of fish sampled. A few fish may attempt to shorespawn as the occasional redd was observed. A solution to the problem of lack of angling success may be to relieve the fish of their spawnbound condition by creating a short section of artificial spawning stream. Upon identification of a suitable location, lake water can be pumped up to a small reservoir and then released to simulate a stream of flowing water. By allowing the fish to release their eggs/milt, the spawnbound condition is relieved, hopefully triggering active feeding.

Two other enhancements to be considered include:

1. Stocking brook trout into Pothole Lake. Brook trout may use the present population of lake chub as a forage base and shore spawn more readily.
2. Upgrade the present trail into Pothole Lake. The trail entrance is overgrown and very difficulty to spot. More people would find the lake if the entrance to the trial was cleared and a sign erected. The construction of a stairway over a vertical drop at the start of the trail would make that section more passable.

STOCKING RECORD **FIRST STOCKED IN: 1980**

YEAR	NUMBER	SPECIES	NO/KG.	GRAMS	SOURCE
1989	2500	rainbow	96	10.4	Tunkwa
1987	2500	rainbow	78	12.8	Tunkwa
1985	2500	rainbow	1224	0.8	Premier
1983	5000	rainbow	250	4.0	Premier
1982	5000	rainbow	250	4.0	Premier
1981	5000	rainbow	175	5.7	Premier
1980	10000	rainbow	159	6.3	Badger

Stocking record from Fisheries Branch files, Prince George.

Lake: **POTHOLE NO. 1**

HISTORY OF PREVIOUS SURVEYS

Lake Surveys:

December 7, 1979 - Anonymous. Unpublished data sheets containing a brief inventory of Pothole Lake No. 1 (lake was unnamed at time of this initial survey and went under the aliases "43 Mile" or "Pothole" Lake).

Information located at Recreation Fisheries Branch, Prince George, B.C.

Other Related Surveys:

None known.

Lake: **POTHOLE NO. 1**

WATER CHEMISTRY SUMMARY Limnology Station No. 1

Field Conditions:

Date:	June 15, 1989		
Time:	1600 hrs	Air Temperature:	21°C
Wind Velocity:	5 km/hr	Wind Direction:	N.E.
Cloud Cover:	8/10 O.C.	Surface Condition:	ripple
Secchi Disc:	17.45 m	Water Colour:	turquoise

Method(s) Used:

Dissolved Oxygen:	YSI model 58 oxygen/temperature meter
Water Temperature:	YSI model 58 oxygen/temperature meter
Air Temperature:	Hand held alcohol thermometer
pH (field):	Hach color comparitor
H2S (field):	Hach H2S field test kit
Laboratory Used:	Zenon Environmental Inc. B.C. Laboratory Services
Water Sampler:	Verticle Alpha Water Bottle (Vandorn)
Substrate Sampler:	Substrate sample not taken

Water Sample Chemistry: SEAM Site No.: Not determined

	Sampling Depths	
	Surface (O m)	Lower (29.0 m)
pH (field)	7.9	7.1
pH (lab)	8.3	7.7
Specific Conductance (lab)	184 umhos/cm	211 umhos/cm
Filterable Residue 105°C (lab)	100 mg/l	122 mg/l
H2S (field)	- mg/l	0 mg/l

Bottom Depth:	30.0 m
Substrate Sample Depth:	- m

Note:

Water samples too long in transit to guarantee accuracy of pH (lab) results.

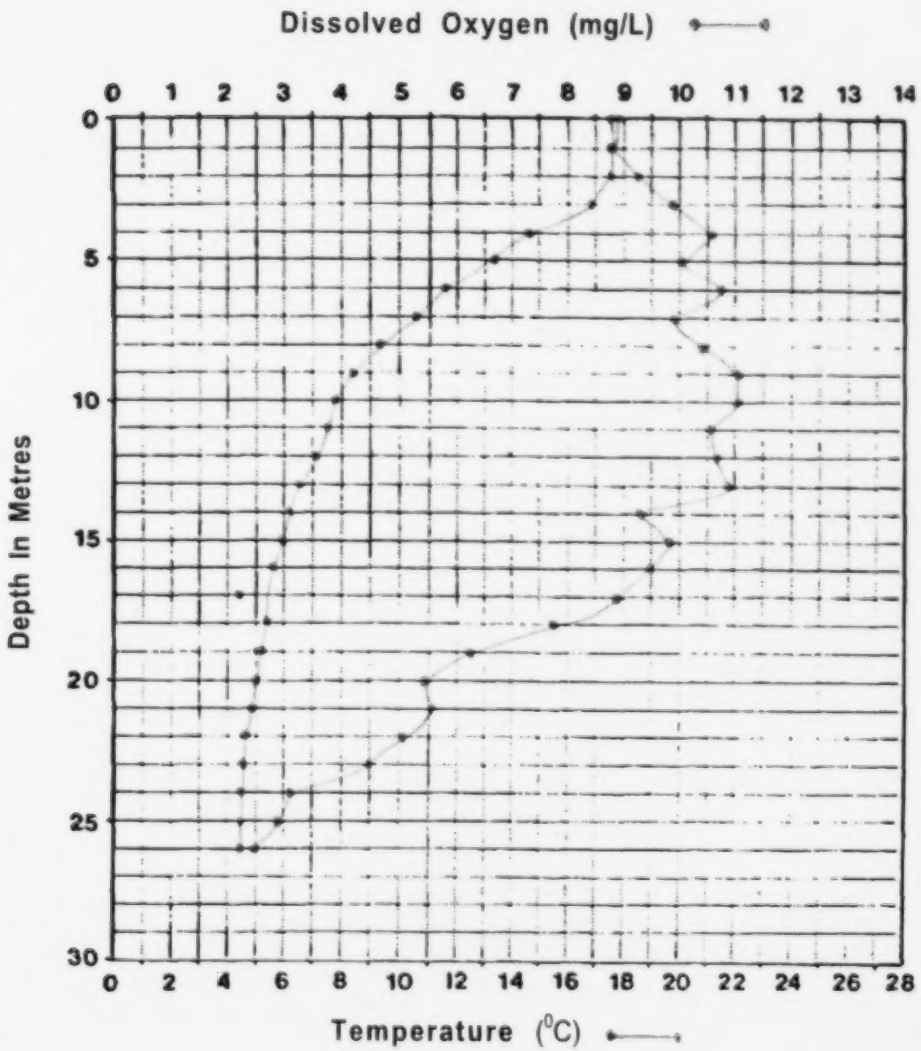
Lake: **POTHOLE NO. 1**

OXYGEN/TEMPERATURE DATA

Depth (m)	02 (mg/L)	Temp (°c)
surface	8.9	17.7
1.0	8.8	17.7
2.0	9.3	17.6
3.0	9.9	16.9
4.0	10.6	14.8
5.0	10.1	13.3
6.0	10.8	11.7
7.0	9.9	10.6
8.0	10.4	9.3
9.0	11.1	8.4
10.0	11.1	7.9
11.0	10.6	7.6
12.0	10.7	7.1
13.0	10.9	6.6
14.0	9.4	6.2
15.0	9.8	6.0

Depth (m)	02 (mg/L)	Temp (^{0}C)
16.0	9.5	5.7
17.0	8.9	4.5
18.0	7.8	5.3
19.0	6.3	5.2
20.0	5.4	5.0
21.0	5.6	4.9
22.0	5.1	4.8
23.0	4.5	4.8
24.0	3.2	4.7
25.0	2.9	4.6
26.0	2.5	4.5
27.0		
28.0		
29.0		
30.0	bottom	

DISSOLVED OXYGEN AND TEMPERATURE PROFILE



Lake: **POTHOLE NO.** 1

NETTING RECORD

Mesh sizes experimental order: 25,76,51,89,38,64 mm.

NETTING SITE #1

Type:	Sinking Monofilament		
Date Set:	June 15, 1989	Time:	1130 hrs
Date Lifted:	June 15, 1989	Time:	1400 hrs
Net Dimensions:	Length: 91.4 m	Depth:	2.4 m
Shallow End Mesh Size:	25 mm	Depth:	2.5 m
		Substrate:	Organics over inorganic fines
Deep End Mesh Size:	64 mm	Depth:	20.0 m
		Substrate:	Organics

Comments:

Fish captured throughout net, suggesting sufficient oxygen to depth of 20 m.

Lake: **POTHOLE NO. 1**

LAKE CATCH SUMMARY

SPECIES	NET SET NUMBER				ANGLED	OTHER	TOTAL	NUMBER SAMPLED	NUMBER PRESERVED	SIZE RANGE (cm)
	1	2	3	4						
Rainbow trout	22				2	-	24	22		28.8 - 44.1

MINNOW TRAPS:

BAIT: Sardines

#	HOURS	DEPTH (m)	SUBSTRATE	SPECIES	SIZE RANGE (cm)
1	4.5	0.5	organic debris	110 lake chub	6.5 - 8.2
2	4.5	0.5	organic debris	75 lake chub	as above

Lake: POTHOLE NO. 1

INDIVIDUAL FISH DATA

Date Captured: June 15, 1989

Method of Capture: Sinking monofilament gillnet

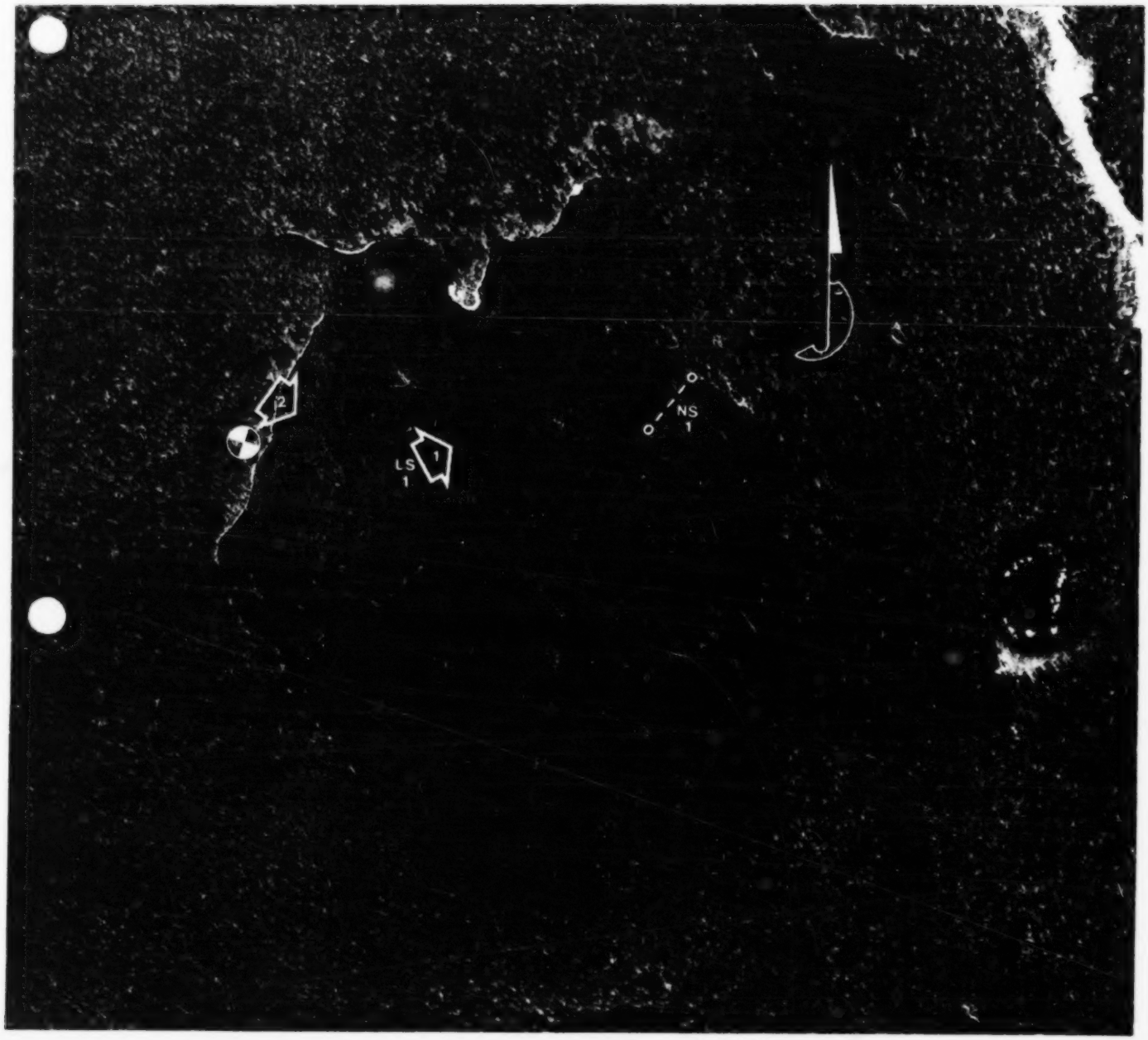
M -Male
F -Female
? -Not Obvious

IMM - Immature
MG -Maturing
MT -Mature
GV -Gravid
SP -Spent
? -Not Obvious

EG -Egg
FR -Fin Ray
HD -Head
ML -Milt
OT -Otolith

SC -Scale
ST -Stomach
TG -Fish Tag
WF -Whole Fish

Species	Fork Length (cm)	Weight (g)	Sex	Gonadal maturity	Sample Type	Age (yr)	Plankton	Stomach Contents Insects	Fish	Other	Comments
Rainbow trout	28.8	280	F	GV	SC	3+		Chironomids		detritus	spawnbound; new eggs developing
Rainbow trout	29.6	335	F	GV	SC	3+	Hyalella sp.			detritus	tapeworms; spawnbound; new eggs developing
Rainbow trout	31.9	365	M	GV	SC	2+					empty; tapeworms;
Rainbow trout	32.2	335	M	GV	--	--				rainbow trt. egg	tapeworms; no scales taken
Rainbow trout	32.5	380	M	GV	SC	4+		Chironomids		detritus	tapeworms
Rainbow trout	33.8	470	F	GV	SC	3+					empty; new eggs developing
Rainbow trout	35.2	460	M	GV	SC	3+	Hyalella sp.	Diptera larva			tapeworm nodules
Rainbow trout	35.4	480	M	GV	SC	6+	Hyalella sp.	dragonfly Diptera larva Chironomids			tapeworm nodules
Rainbow trout	36.0	550	F	MG	SC	3+		Dipt. larva Chironomids		detritus	fish is silver; tapeworms
Rainbow trout	36.7	580	F	GV	SC	3+					empty; tapeworm nodules spawnbound
Rainbow trout	37.2	475	F	GV	SC	3+	Hyalella sp.	Dipt. larva Chironomids		detritus	spawnbound; new eggs developing; tapeworms
Rainbow trout	37.3	620	F	GV	SC	3+	Hyalella sp.	Diptera larva		detritus	new eggs developing; spawnbound
Rainbow trout	38.5	--	F	GV	SC	3+	Hyalella sp.	Dipt. larva Chironomids			new eggs developing; tapeworms; spawnbound
Rainbow trout	38.8	660	F	GV	SC	3+	Hyalella sp.	Dipt. larva Chironomids		detritus	spawnbound
Rainbow trout	39.2	675	F	GV	SC	4+		Dipt. larva Chironomids		detritus	new eggs developing; spawnbound; tapeworms
Rainbow trout	39.6	650	M	GV	SC	3+					stomach empty
Rainbow trout	39.7	725	F	GV	SC	4+	Gammarus sp.	Dipt. larva caterpillar			new eggs developing; spawnbound
Rainbow trout	40.0	750	F	MG	SC	4+					fish silver colour; tapeworms; empty stomach
Rainbow trout	40.0	800	F	GV	--	--					stomach empty; light pink flesh; no scales taken; spawnbound
Rainbow trout	41.2	735	M	GV	SC	4+					tapeworms; stomach empty
Rainbow trout	43.5	780	M	GV	SC	5+	Hyalella sp.	Dipt. larva			very dark spawning colours
Rainbow trout	44.1	860	M	SP	SC	5+	Hyalella sp.	Dragon fly			tapeworms



LOCATION OF INVENTORY SITES

Figure 1

Lake: Pothole No.1
Reference No.: B.C. 7369:263
Reference Date: July 31, 1971
Scale: 1: 4398

1 Plate number, area, and direction

2 Point sample, number, and location

Bench mark

LS 1 Limno station location and number

NS 1 Netting site location and number

1 Stream flow direction and number

Lake: POTHOLE NO. 1

PHOTOGRAPH DIRECTORY

Negative #	Plate #	Description
R2: 34A,35A,36A	1	Panoramic view of shoreline looking northeast from the limno station towards the net set location.
R12: 5A,6A,7A	2	Panoramic view of shoreline looking southeast from the access point.
R12: 4A	3	View of trail entrance to Pothole Lake No. 1 (plate not indicated on air photo).

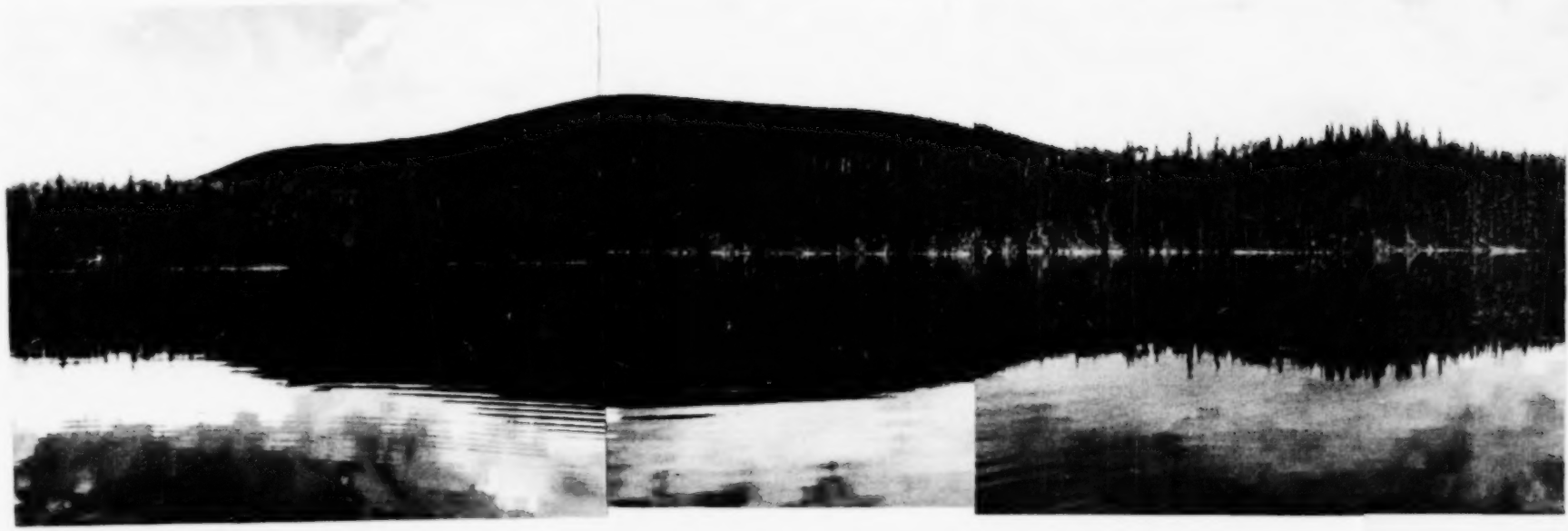


Plate 1: Panoramic view of shoreline looking northeast from the limno station towards the net set location.

Plate 2: Panoramic view of shoreline looking southeast from the access point.

POTHOLE LAKE No. 1

Plate 3: View of trail entrance to pothole Lake No, 1 (Plate not indicated on airphoto).

Lake: **POTHOLE NO. 1**

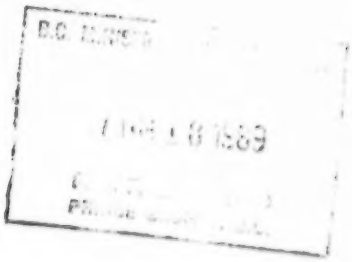
Appendix A

LABORATORY REPORT

Water Chemistry Analysis

No.1

Recreational Fisheries



Sample 89001329

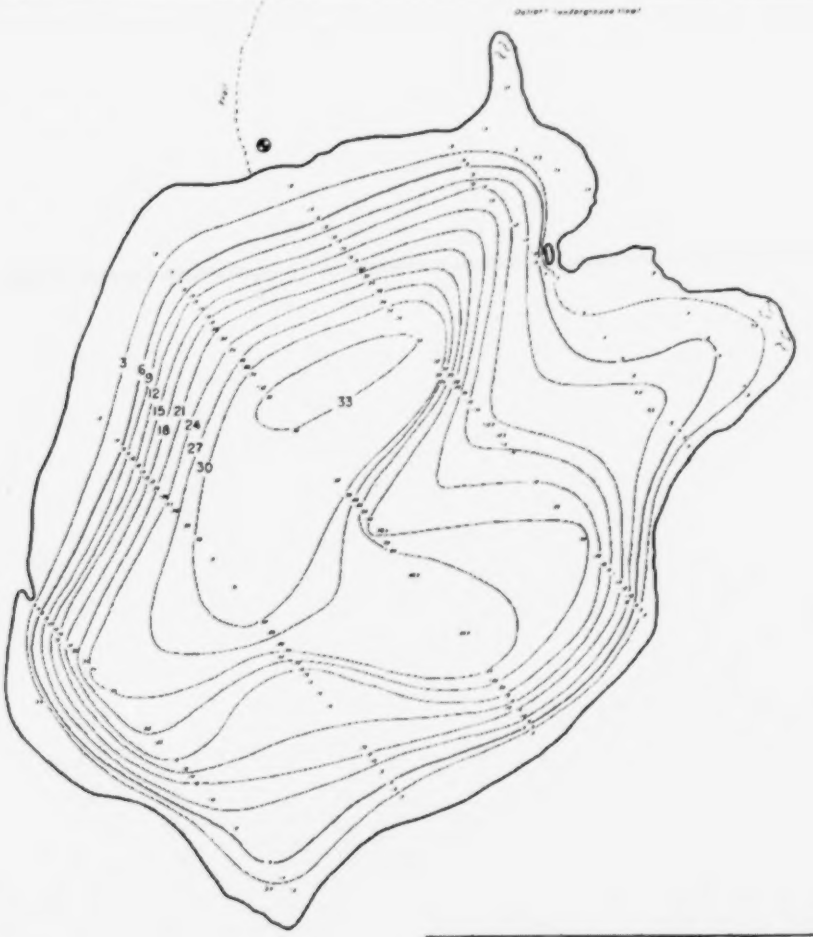
Parameter Description	Result	Unit	Analytical Technique (Code/Medium/Proc'n)
pH		pH units	Automated pH Meter (00403/20/02/01)
Residue - Filterable		mg/L	Dry @ 180 Deg C Buchner 105C (00515/70/02/01)
Specific conductance		uS/cm	Field Meter Symbols (00094/60/02/01)
Res. Filterable (105 Deg. C)		mg/L	Gravimetric 1.0u Filter (00515/38/02/01)
Alkalinity, Total As CaCO3		mg/L	Automated Electrometer (00410/20/02/01)

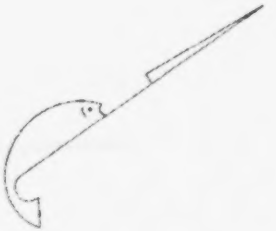
ATTN DUANE HANSON

Sample #:004326

No. 1

Parameter Description	Result	Units	Analytical Technique (Sparcode/Medium/Prep)
pH		pH units	Automated pH Meter (00041220/02/01)
Residue (Filterable)		mg/L	Dried, 0.45 um Buchner, 105C (00308100/02/01)
Specific Conductance		uS/cm	Lab Meter Siebold (00111160/02/01)
Residue Filterable 1.0u		mg/L	Gravimetric 1.0u Filter (00741032/02/01)
Alkalinity Total As CaCO3		mg/L	Automated Electrometer (00102110/02/01)





Reduced to

33%

of Original

INSET MAP

SURVEYED BY: D.A. of SSDS DATE: June 15 1989
OUTLINE SOURCE: AIR PHOTO BC 7569:263 (JULY 1979)

STATISTICS AT TIME OF SURVEY

ELEVATION	693 m ±
SURFACE AREA	10.703 sq.m.
AREA ABOVE 1m. CONTOUR	5.5 700 sq.m
VOLUME	7 969 000 cu.m
MEAN DEPTH	15.0 m
MAX. DEPTH	33.0 m
PERIMETER, MAIN SHORE	1 950 m
PERIMETER, ISLANDS	70 m
BENCH MARK (DESCRIPTION) ABOVE WATER LEVEL	2.0 m

Province of British Columbia
Ministry of Environment

RECREATIONAL FISHERIES BRANCH
HABITAT MANAGEMENT SECTION

POTHOLE LAKES
(No. 1)

DEPTHS IN METRES

WATERSHED CODE 49-700-000	UTM GRID ZONE 10	
N.T.S. 92 I/1	SURVEYED BY D.A.	REV. DATE
PLOTTED BY D.A.	TAPE CHKD. BY D.A.	SCALE 1:1500
CHECKED BY	DRAFT CHK. BY	
NOTES WRITTEN BY	APPROVED BY	M.O.E. NO.
DATA ENTRY BY		930/11